Durum wheat response to post N and foliar fungicides, Carrington, 2023
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The irrigated field trial was conducted for a third year at the NDSU Carrington Research Extension Center with support from the ND Wheat Commission. Study objective is to examine durum seed yield and quality response, primarily seed protein and vitreous kernels (hard count), to intensive management with application of post-emergence applied nitrogen (N) and foliar fungicides. Experimental design was a randomized complete block with factorial arrangement and four replicates. Soil N at trial establishment: 67 lb/acre residual nitrate-N plus 30 lb/acre credit from 2022 field pea crop. Urea was preplant applied at 30 lb N/acre across trial on May 5 and incorporated by 2.4 inches of rain occurring May 6-8. 'ND-Riveland' was seeded at 1.4 million PLS/acre on May 12. Soil was conventional-tilled Heimdal-Emrick loam with 9 ppm P, 166 ppm K, 2.6% organic matter, 8.1 pH (0-6 inch depth) and 0.32 mmho/cm soluble salts (0-6 inch depth). UAN (liquid 28-0-0) was applied at 30 lb N/acre using stream bars for early season top-dress N treatments (3 and 4) on June 8 to 5-leaf stage plants and incorporated with at least 0.5 inches of irrigation water on June 12. Fungicides were applied with a CO_2-hand-boom plot sprayer delivering 14 gal/acre at 40 psi through TJ60 8002EVS nozzles. Miravis Ace at 13.7 fl oz/acre plus Induce (NIS) at 0.125% v/v was applied across trial on July 11 with 56 F, 77% RH and 4 mph wind to early flower stage plants. Prosaro at 8.2 fl oz/acre plus Induce at 0.125% v/v was sequentially applied for treatments 2, 4 and 6 on July 17 with 72 F, 48% RH and 4 mph wind to late-flower stage plants. UAN was applied at 10 gpa (30 lb N/acre) plus 10 gal/acre water at 35 psi through TJ XR 80015VS nozzles for treatments 5 and 6 on July 19 with 67 F, 66% RH and 12 mph wind to early post-flower stage plants. Rainfall plus irrigation (inches): May=4.2; June=6.4; July=5.4; August=2.6; and total period water=18.6. Trial was harvested with a plot combine on August 29.

Wheat stand at 1- to 2-leaf stage on May 24 averaged 990,300 plants/acre. Flag leaf disease and Fusarium head blight (scab) were essentially absent from the trial and were not recorded. Visually evaluated flag leaf necrosis present six days after post-flower stage application of N ranged from 1-3 (scale 0-9; 9=complete necrosis). Plant lodging was absent at maturity.

Averaged across fungicide treatments, post N application extended maturity two days compared to the untreated check (Table). Seed yield was similar among treatments. Seed protein content increased 1.2 and 1.5 percentage points with N application at tillering and post-flower stages, respectively, compared to the untreated check. Vitreous kernels increased 6 and 10 percentage points with N application at tillering and post-flower stages, respectively, compared to the untreated check. Averaged across N treatments, fungicides did not impact plant development or seed yield and quality. Slight test weight differences occurred among treatments with the two-factor interaction.

Table. Durum wheat response to post N, Carrington, 2023.

Treatment		Plant		Seed				
		Heading	Physiological maturity					
		Day of year[1]		Yield	TW	Count	Protein	Vitreous[2]
Input	Plant stage			bu/A	lb/bu	no./lb	%	
	untreated check	191	227	76.0	62.4	9,329	12.2	85
	tillering	191	229	83.0	62.1	9,161	13.4	91
N	post flower	191	229	79.3	62.4	9,331	13.7	95
CV (%)		0	0.4	7.5	0.4	3	3.1	3.5
LSD (0.05)		NS	1	7.3	NS	NS	0.5	4

[1]191=July 10; 227=Aug 15.

[2]Visually evaluated.